METHODS AND APPARTUS FOR
BLENDING PROCESS MATERIALS
by: Jeff A. Wilmer, et al.
Attorney Docket No.: K04767007.80

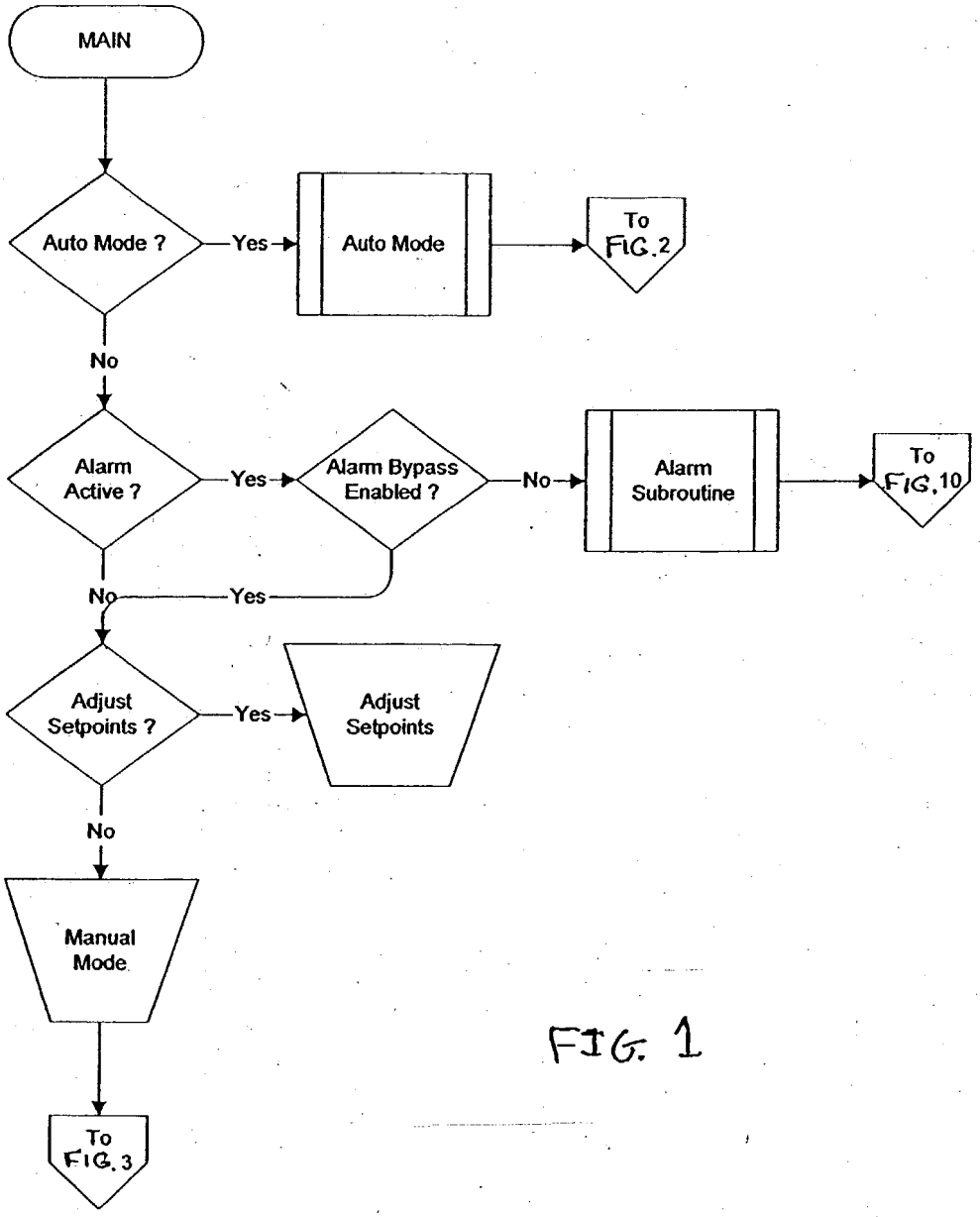

FIG. 1

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FIG. 2

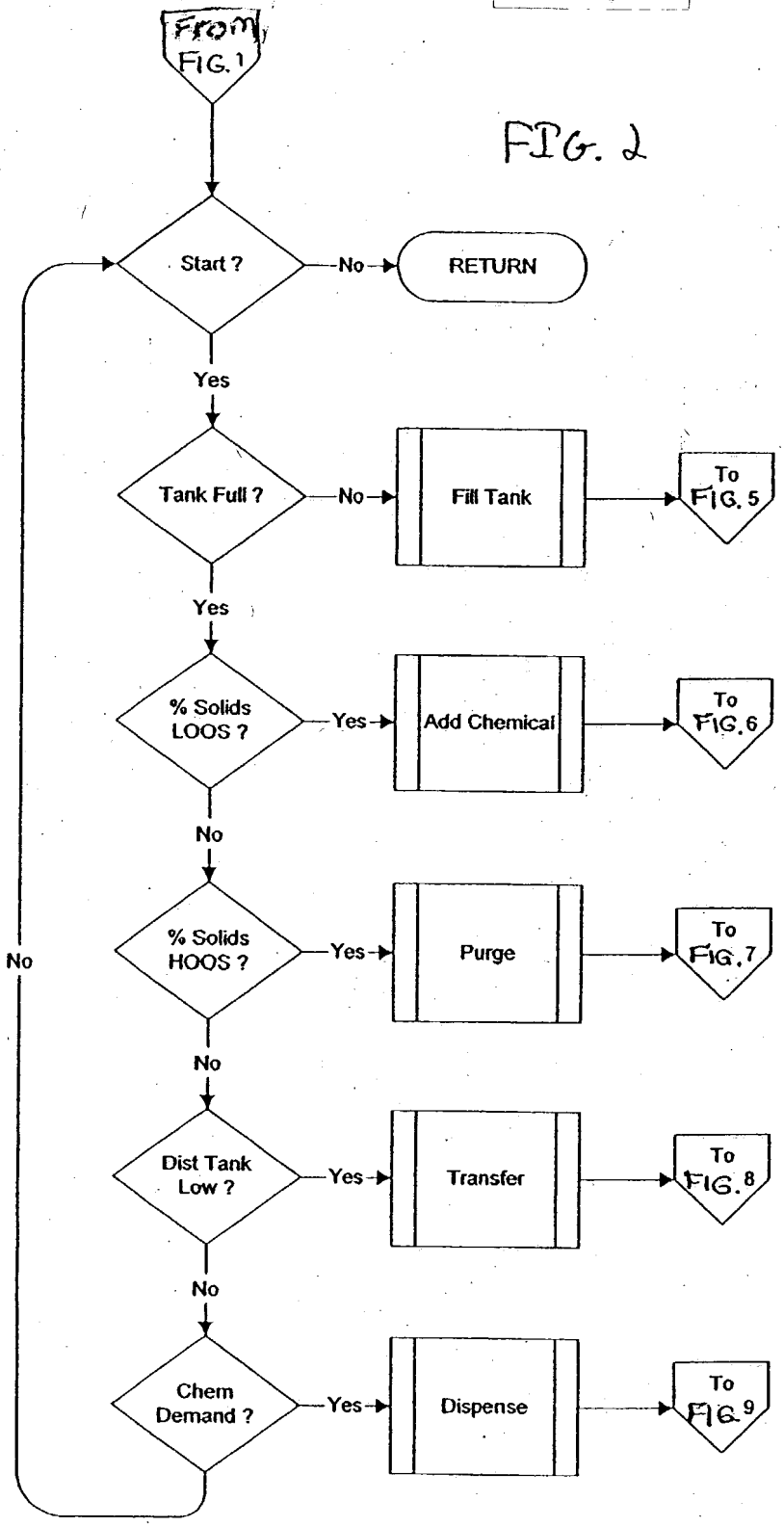


FIG. 3

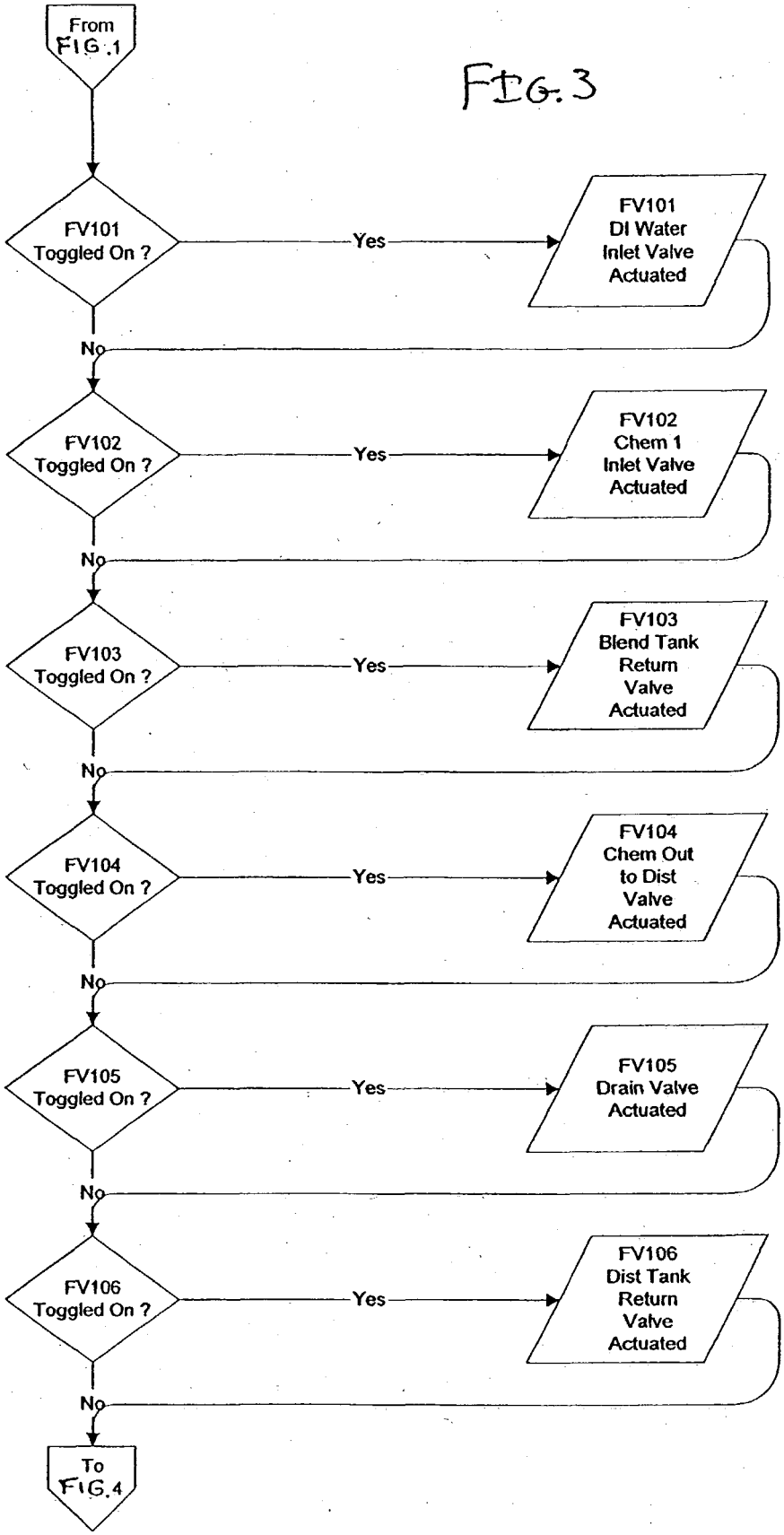

From FIG. 1
FV101 Toggled On ?
Yes
FV101 DI Water Inlet Valve Actuated
No
FV102 Toggled On ?
Yes
FV102 Chem 1 Inlet Valve Actuated
No
FV103 Toggled On ?
Yes
FV103 Blend Tank Return Valve Actuated
No
FV104 Toggled On ?
Yes
FV104 Chem Out to Dist Valve Actuated
No
FV105 Toggled On ?
Yes
FV105 Drain Valve Actuated
No
FV106 Toggled On ?
Yes
FV106 Dist Tank Return Valve Actuated
No
To FIG. 4

FIG. 4

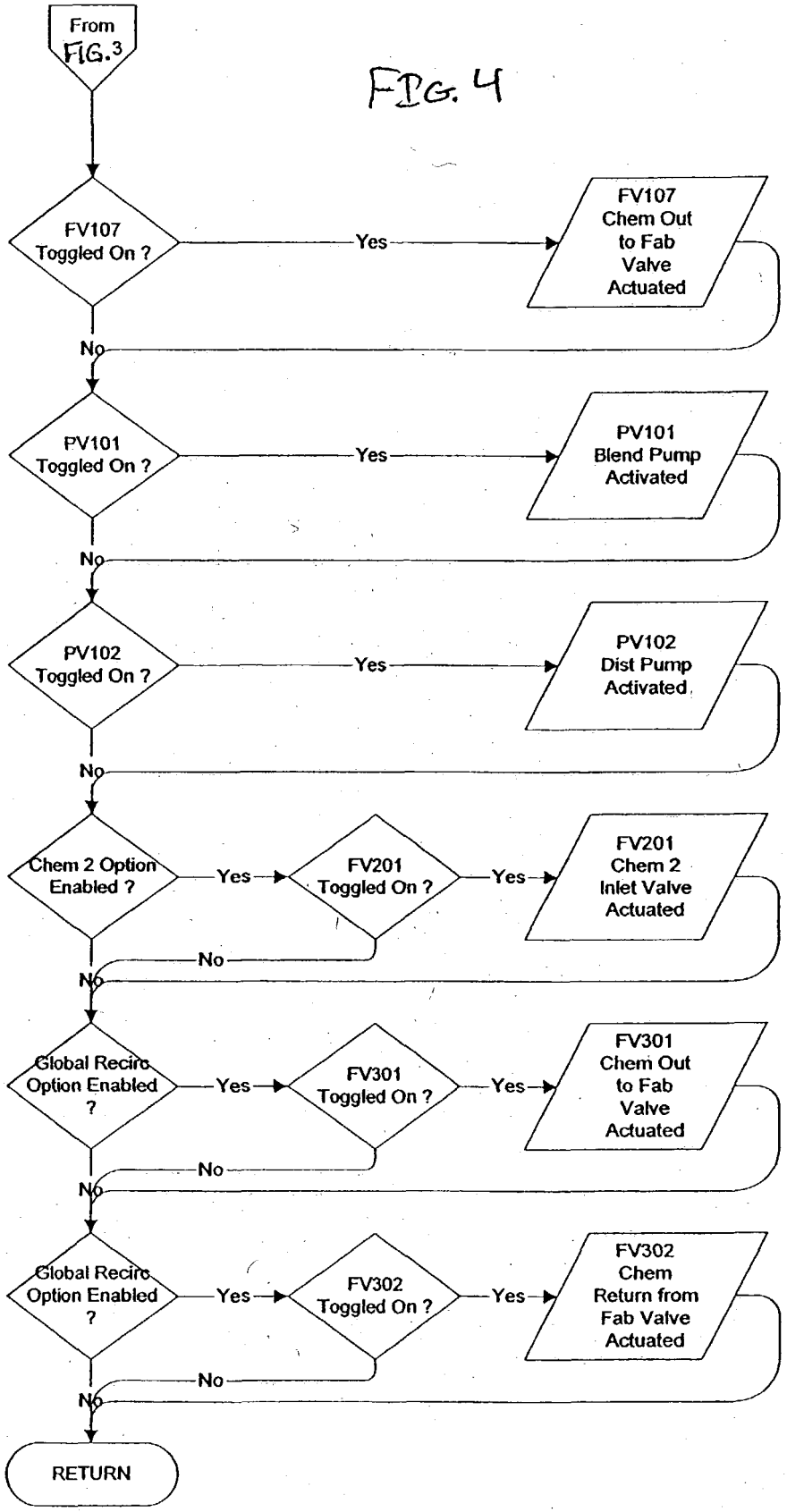

From FIG. 3
FV107 Toggled On ?
Yes
FV107 Chem Out to Fab Valve Actuated
No
PV101 Toggled On ?
Yes
PV101 Blend Pump Activated
No
PV102 Toggled On ?
Yes
PV102 Dist Pump Activated
No
Chem 2 Option Enabled ?
Yes
FV201 Toggled On ?
Yes
FV201 Chem 2 Inlet Valve Actuated
No
No
Global Recirc Option Enabled ?
Yes
FV301 Toggled On ?
Yes
FV301 Chem Out to Fab Valve Actuated
No
No
Global Recirc Option Enabled ?
Yes
FV302 Toggled On ?
Yes
FV302 Chem Return from Fab Valve Actuated
No
No
RETURN

FIG. 5

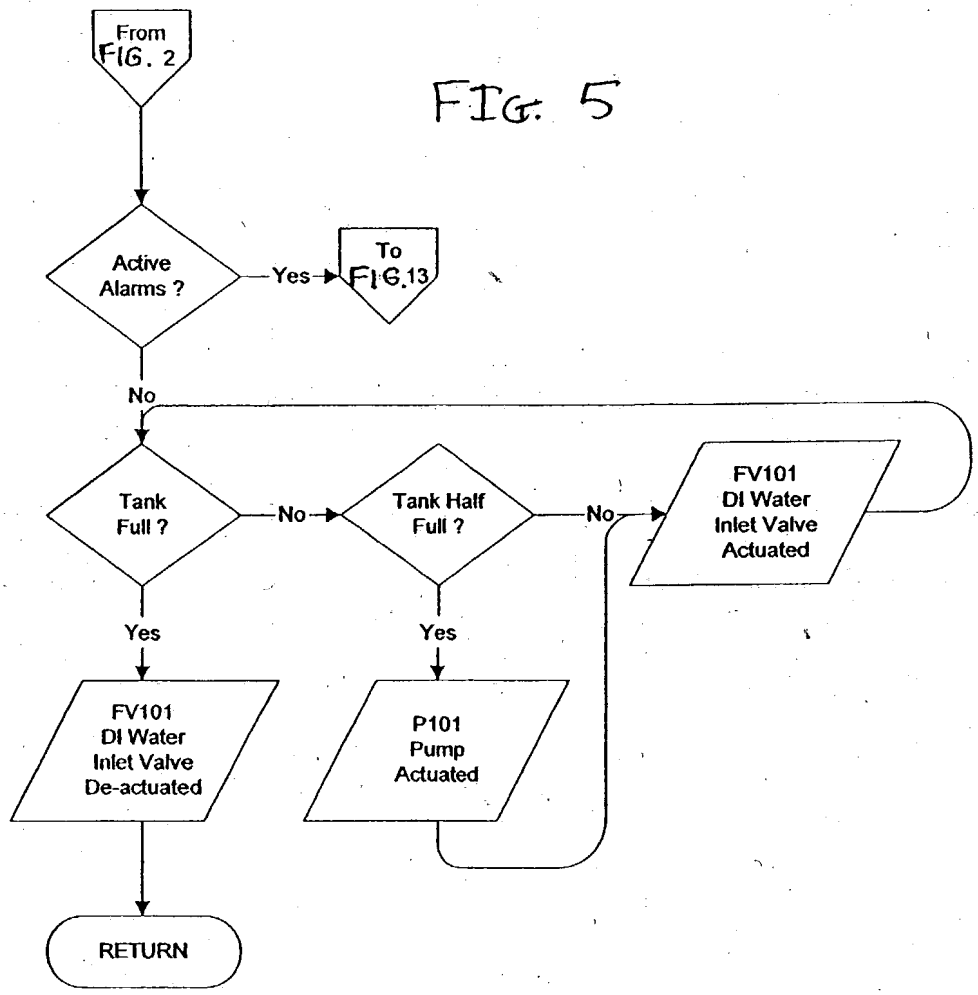

From FIG. 2
Active Alarms ?
Yes
To FIG.13
No
Tank Full ?
No
Tank Half Full ?
No
FV101 DI Water Inlet Valve Actuated
Yes
Yes
FV101 DI Water Inlet Valve De-actuated
P101 Pump Actuated
RETURN

FIG. 6

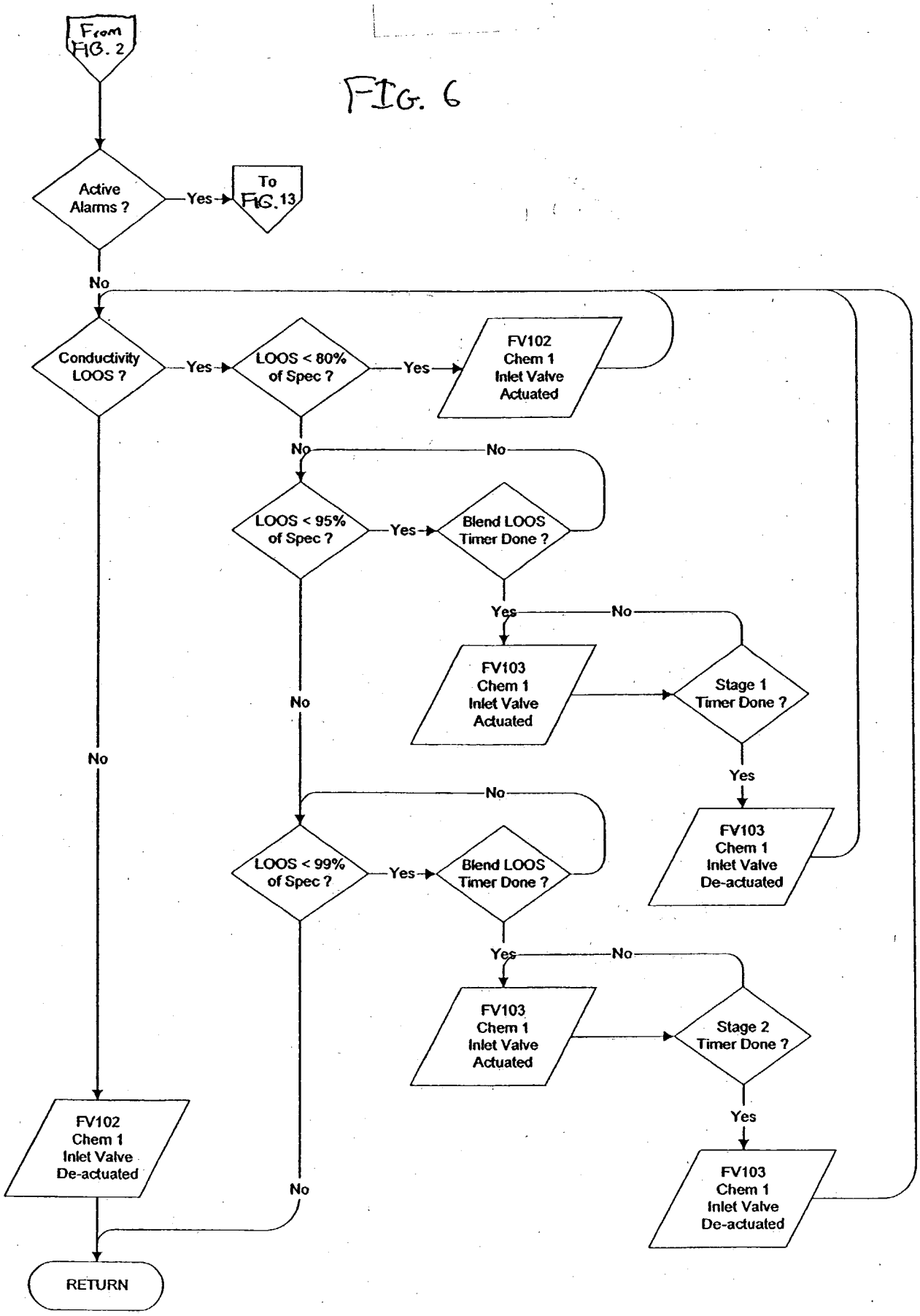

From FIG. 2
Active Alarms ?
Yes
To FIG. 13
No
Conductivity LOOS ?
Yes
LOOS < 80% of Spec ?
Yes
FV102 Chem 1 Inlet Valve Actuated
No
No
LOOS < 95% of Spec ?
Yes
Blend LOOS Timer Done ?
Yes
No
FV103 Chem 1 Inlet Valve Actuated
Stage 1 Timer Done ?
Yes
FV103 Chem 1 Inlet Valve De-actuated
No
No
No
LOOS < 99% of Spec ?
Yes
Blend LOOS Timer Done ?
Yes
No
FV103 Chem 1 Inlet Valve Actuated
Stage 2 Timer Done ?
Yes
FV103 Chem 1 Inlet Valve De-actuated
No
FV102 Chem 1 Inlet Valve De-actuated
No
RETURN

FIG. 7

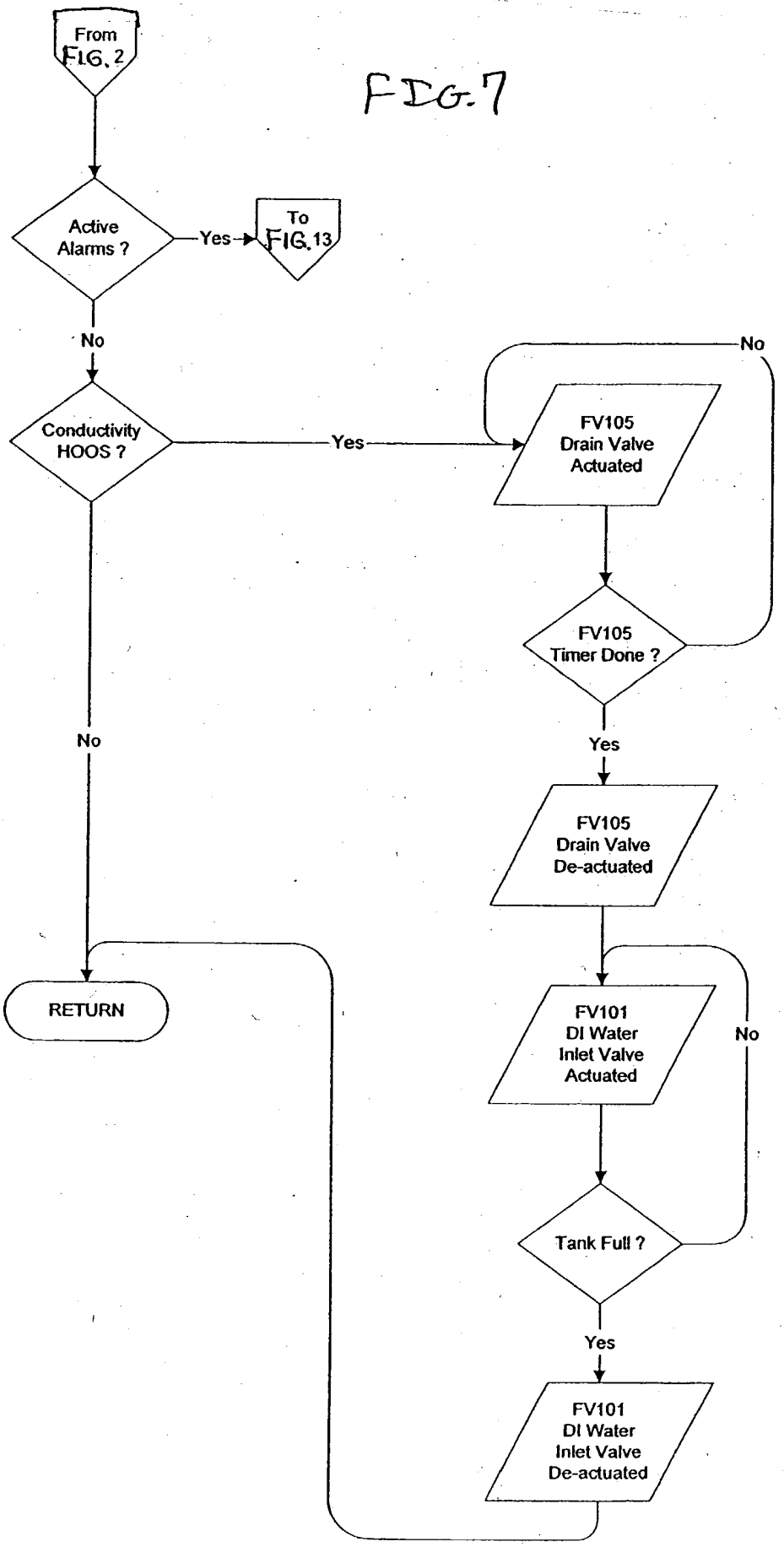

From FIG. 2
Active Alarms ?
Yes
To FIG. 13
No
Conductivity HOOS ?
Yes
No
FV105 Drain Valve Actuated
FV105 Timer Done ?
No
Yes
FV105 Drain Valve De-actuated
FV101 DI Water Inlet Valve Actuated
Tank Full ?
No
Yes
FV101 DI Water Inlet Valve De-actuated
No
RETURN

FIG. 8

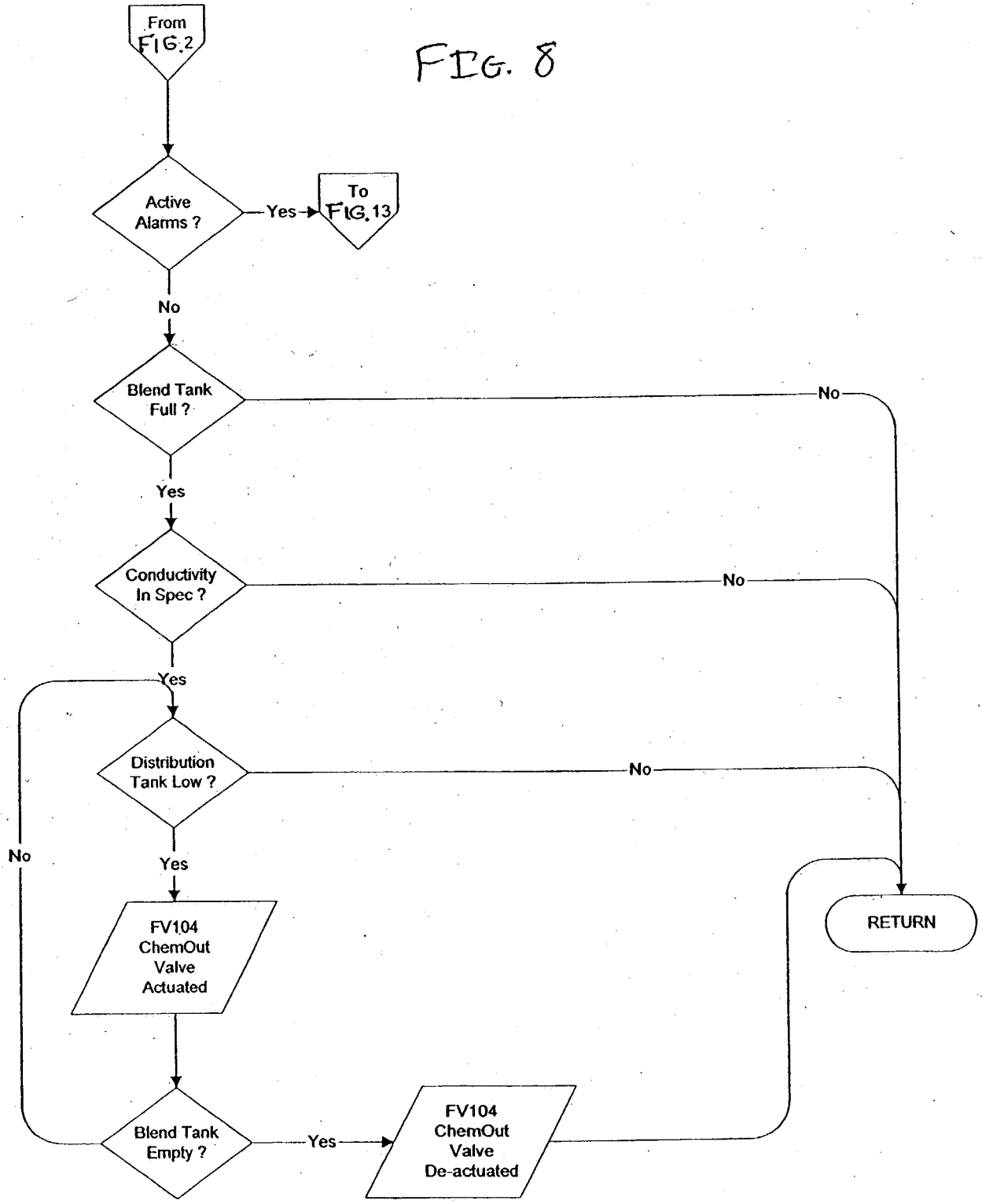

From FIG.2
Active Alarms ?
Yes
To FIG.13
No
Blend Tank Full ?
No
Yes
Conductivity In Spec ?
No
Yes
Distribution Tank Low ?
No
Yes
No
FV104 ChemOut Valve Actuated
RETURN
Blend Tank Empty ?
Yes
FV104 ChemOut Valve De-actuated

FIG. 9

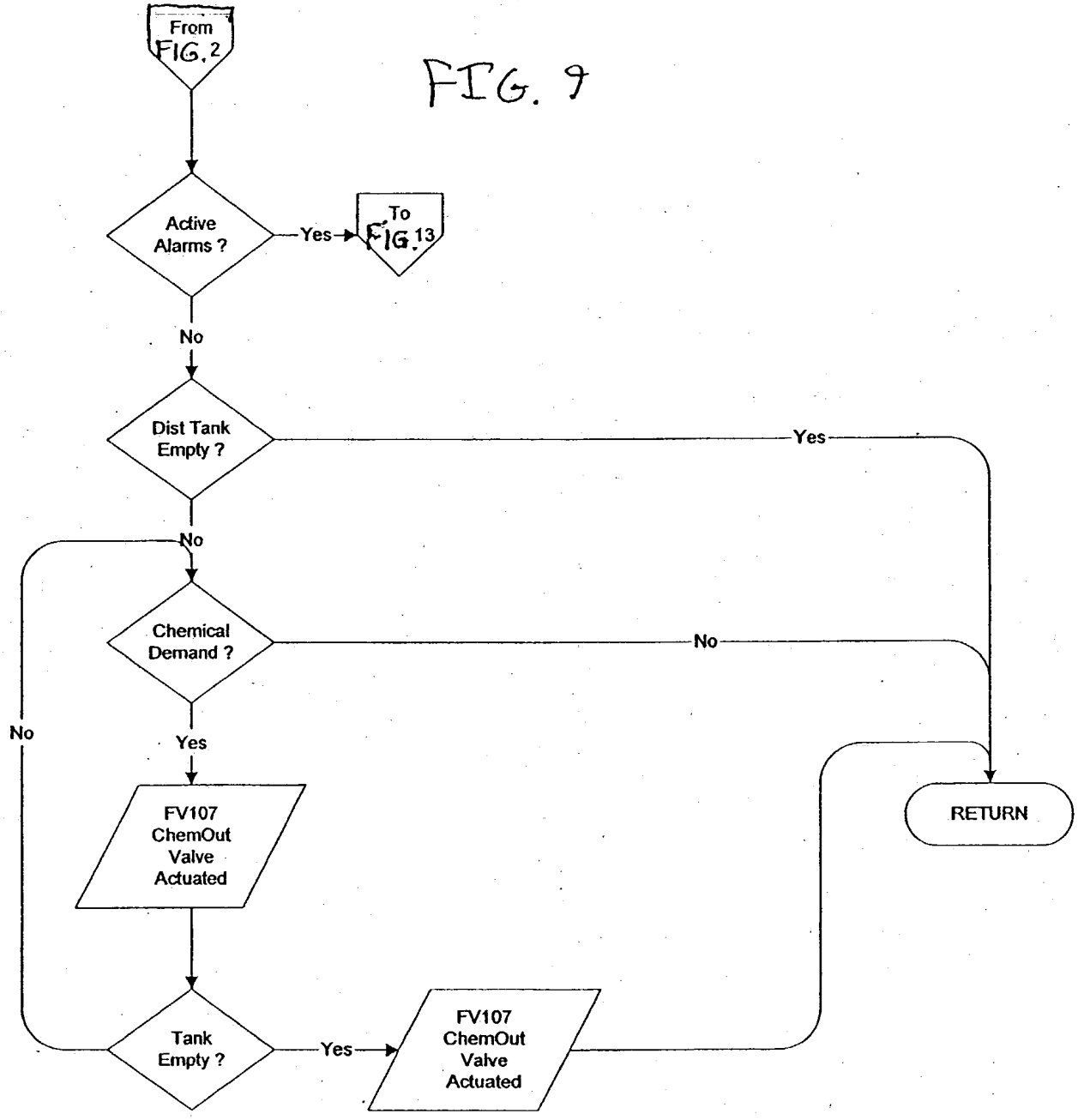

From FIG. 2
Active Alarms ?
Yes
To FIG. 13
No
Dist Tank Empty ?
Yes
No
Chemical Demand ?
No
No
Yes
FV107 ChemOut Valve Actuated
RETURN
Tank Empty ?
Yes
FV107 ChemOut Valve Actuated

FIG. 10

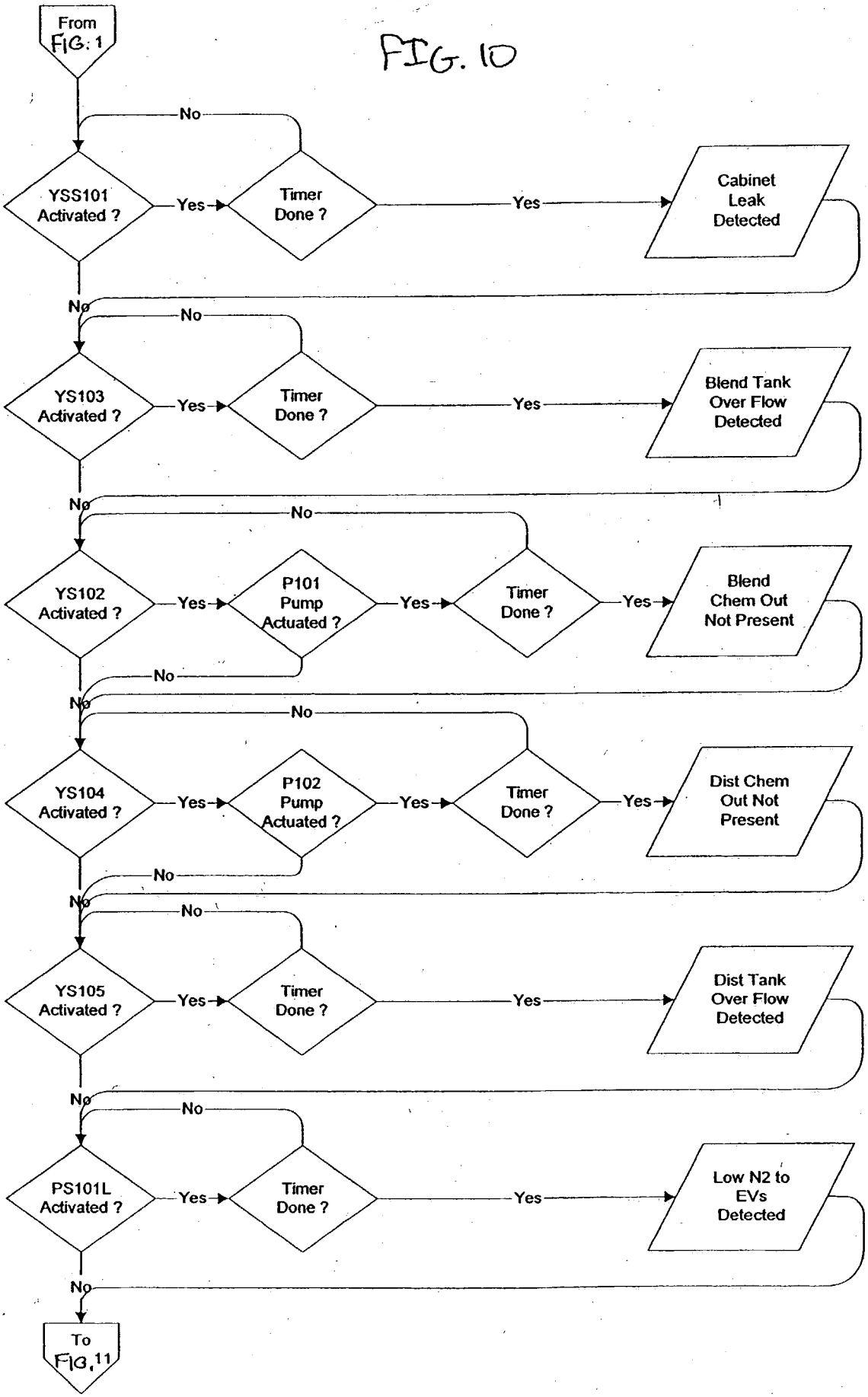

From FIG. 1
YSS101 Activated ?
Yes
Timer Done ?
Yes
Cabinet Leak Detected
No
No
YS103 Activated ?
Yes
Timer Done ?
Yes
Blend Tank Over Flow Detected
No
No
YS102 Activated ?
Yes
P101 Pump Actuated ?
Yes
Timer Done ?
Yes
Blend Chem Out Not Present
No
No
YS104 Activated ?
Yes
P102 Pump Actuated ?
Yes
Timer Done ?
Yes
Dist Chem Out Not Present
No
No
YS105 Activated ?
Yes
Timer Done ?
Yes
Dist Tank Over Flow Detected
No
No
PS101L Activated ?
Yes
Timer Done ?
Yes
Low N2 to EVs Detected
No
To FIG. 11

FIG. 11

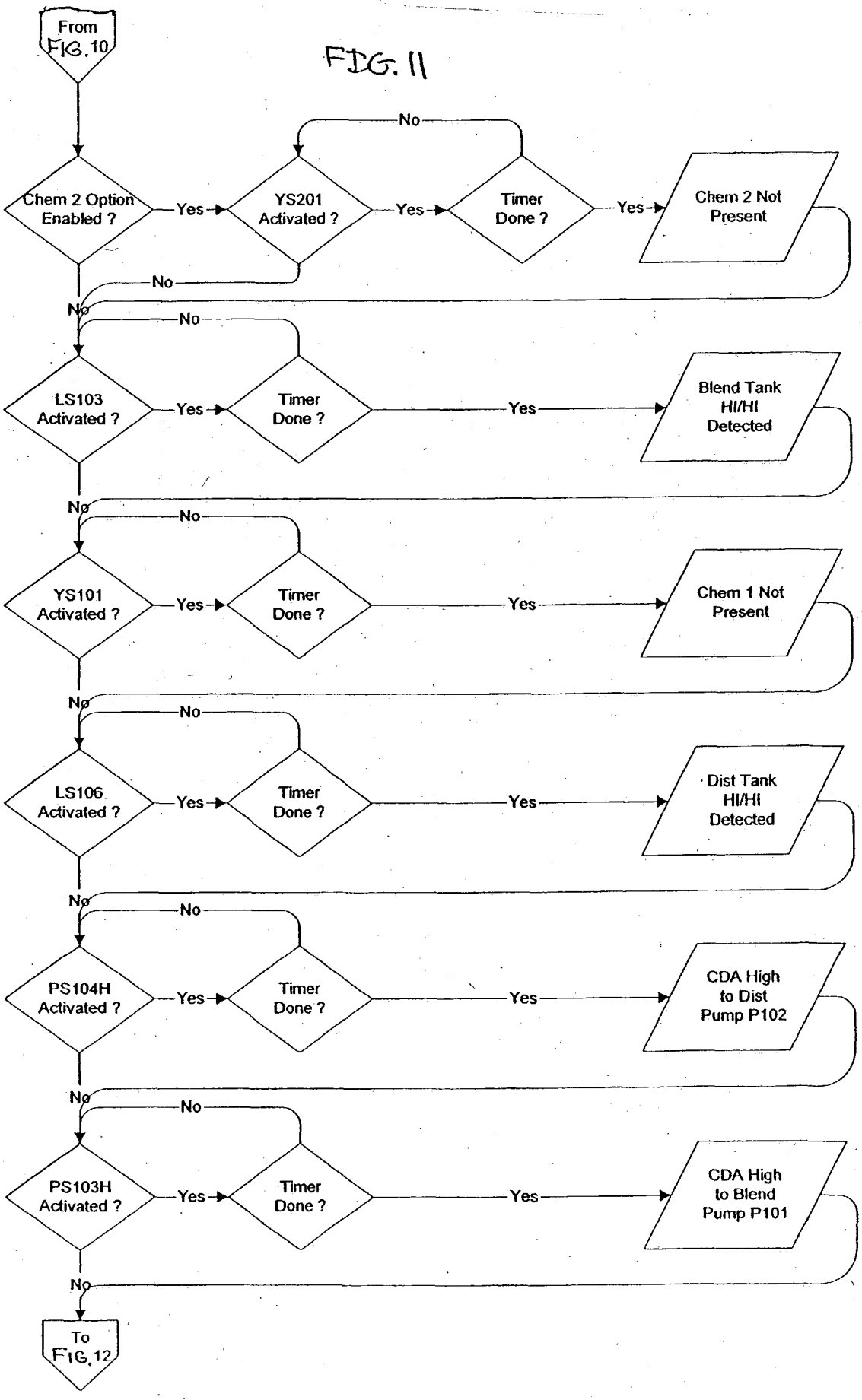
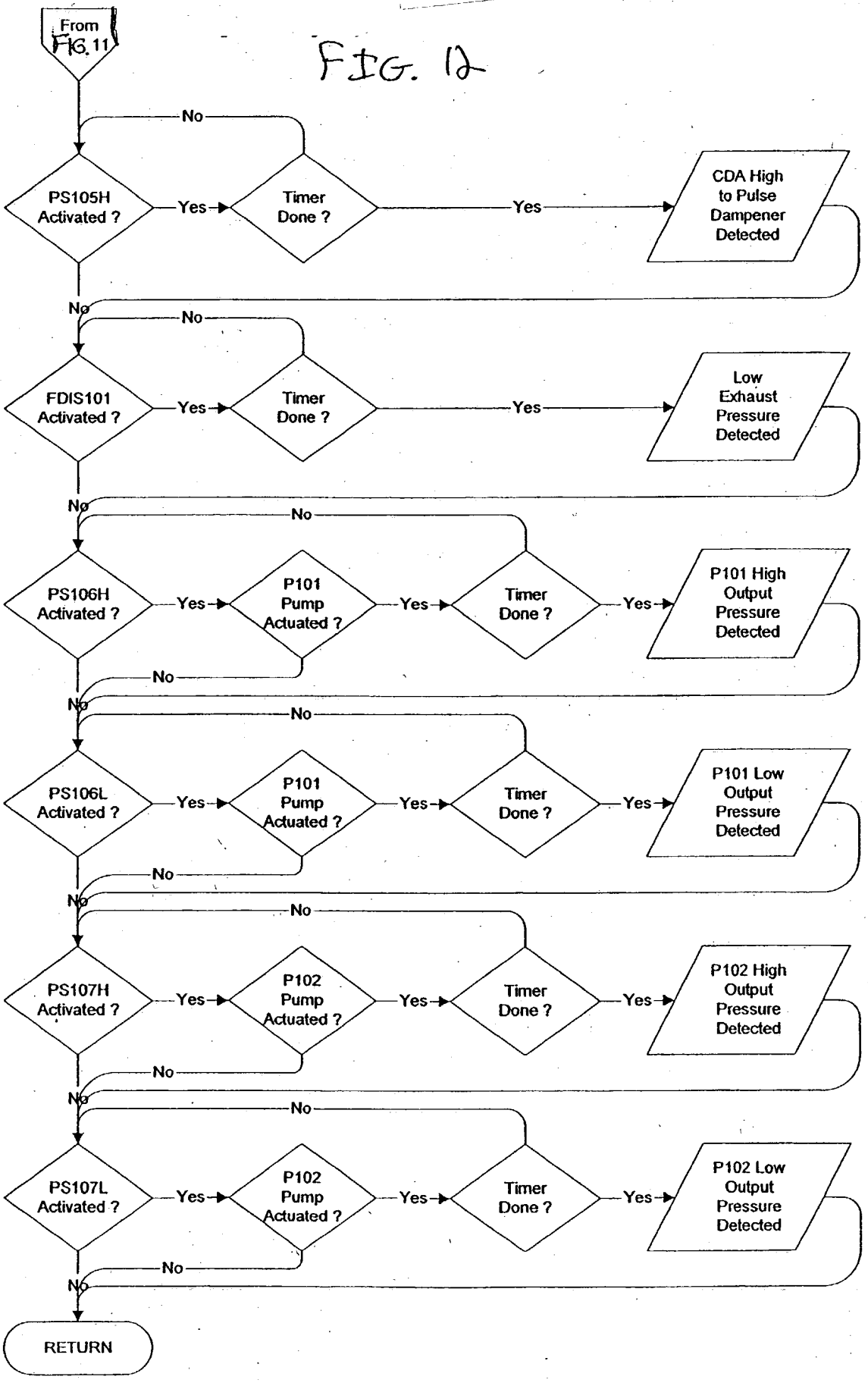

From FIG. 10
Chem 2 Option Enabled ?
Yes
YS201 Activated ?
Yes
Timer Done ?
Yes
Chem 2 Not Present
No
No
No
LS103 Activated ?
Yes
Timer Done ?
Yes
Blend Tank HI/HI Detected
No
No
YS101 Activated ?
Yes
Timer Done ?
Yes
Chem 1 Not Present
No
No
LS106 Activated ?
Yes
Timer Done ?
Yes
Dist Tank HI/HI Detected
No
No
PS104H Activated ?
Yes
Timer Done ?
Yes
CDA High to Dist Pump P102
No
No
PS103H Activated ?
Yes
Timer Done ?
Yes
CDA High to Blend Pump P101
No
To FIG. 12

FIG. 12


From FIG. 11
PS105H Activated ?
Yes
Timer Done ?
Yes
CDA High to Pulse Dampener Detected
No
No
FDIS101 Activated ?
Yes
Timer Done ?
Yes
Low Exhaust Pressure Detected
No
No
PS106H Activated ?
Yes
P101 Pump Actuated ?
Yes
Timer Done ?
Yes
P101 High Output Pressure Detected
No
No
PS106L Activated ?
Yes
P101 Pump Actuated ?
Yes
Timer Done ?
Yes
P101 Low Output Pressure Detected
No
No
PS107H Activated ?
Yes
P102 Pump Actuated ?
Yes
Timer Done ?
Yes
P102 High Output Pressure Detected
No
No
PS107L Activated ?
Yes
P102 Pump Actuated ?
Yes
Timer Done ?
Yes
P102 Low Output Pressure Detected
No
RETURN

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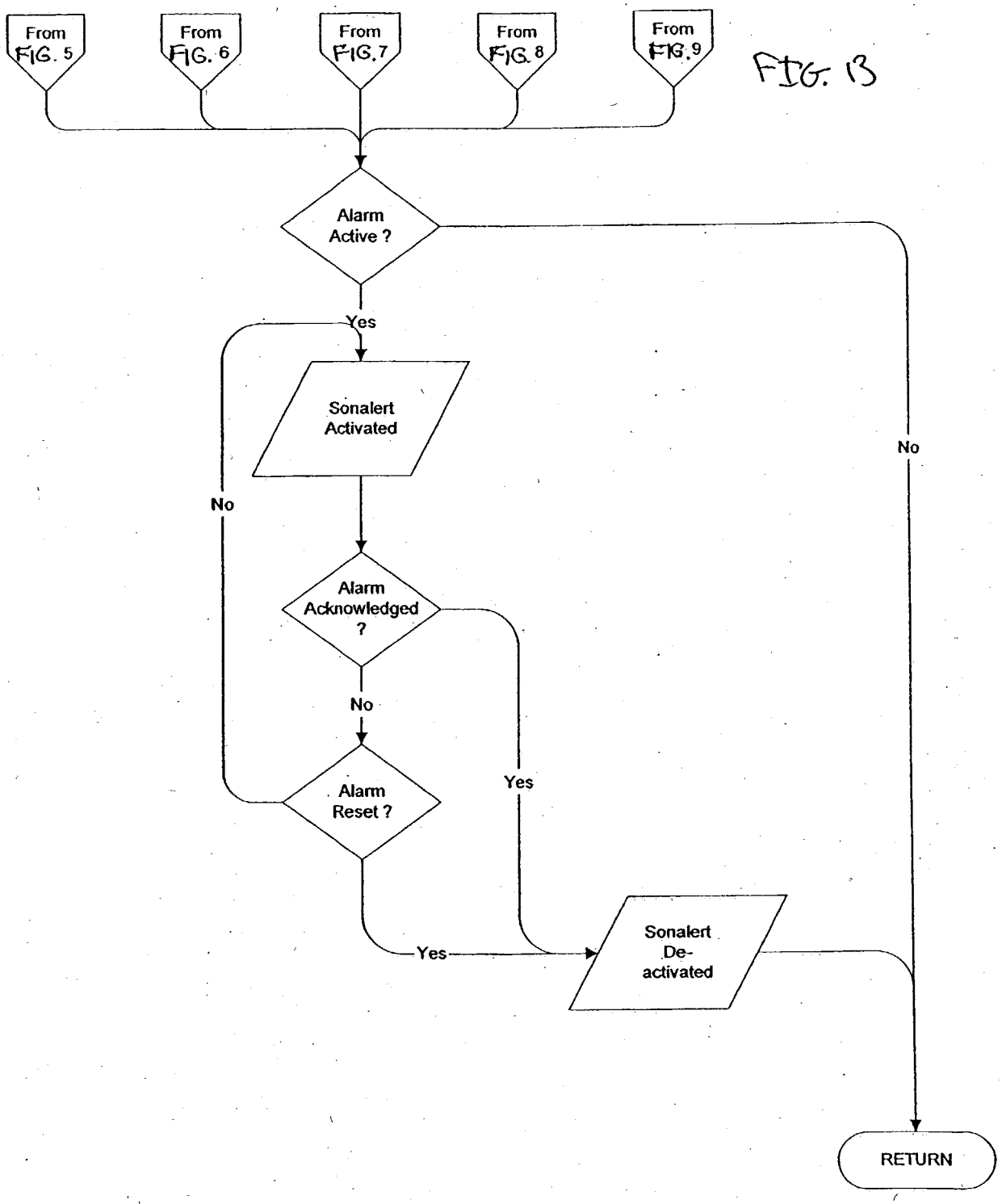

FIG. 13

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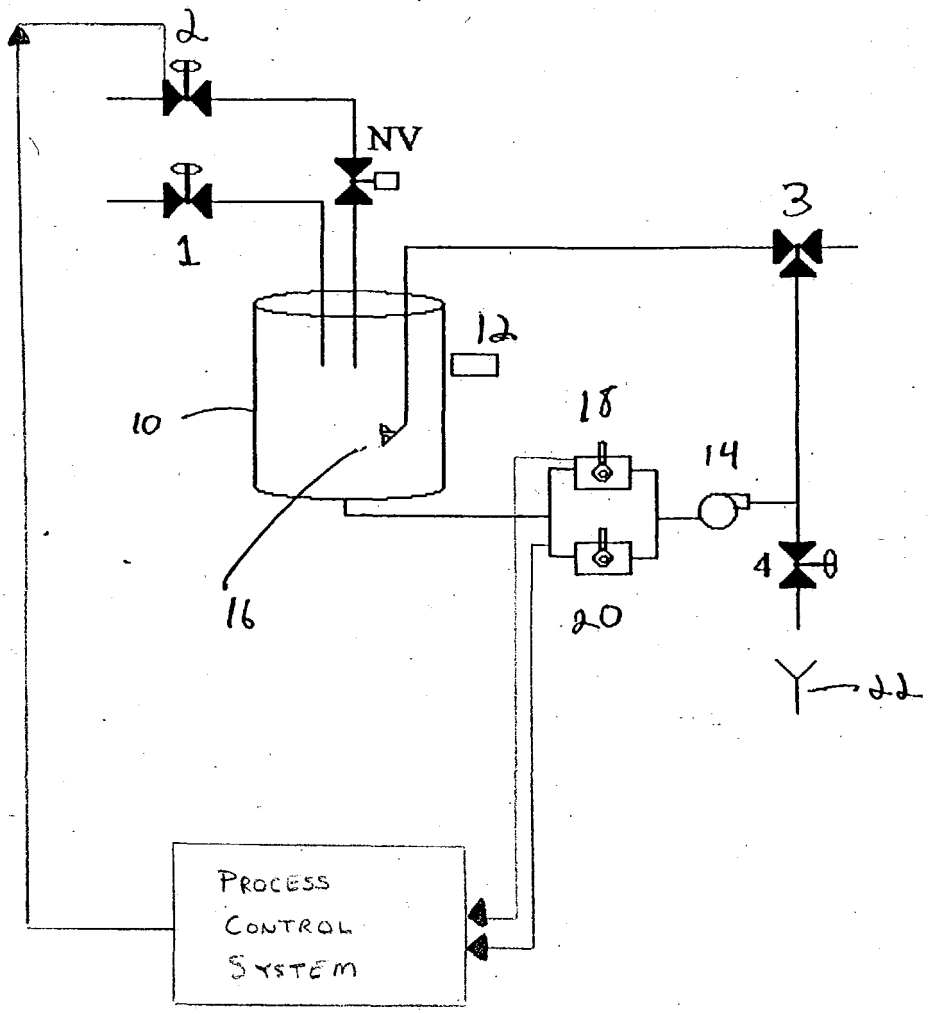
FIG. 14



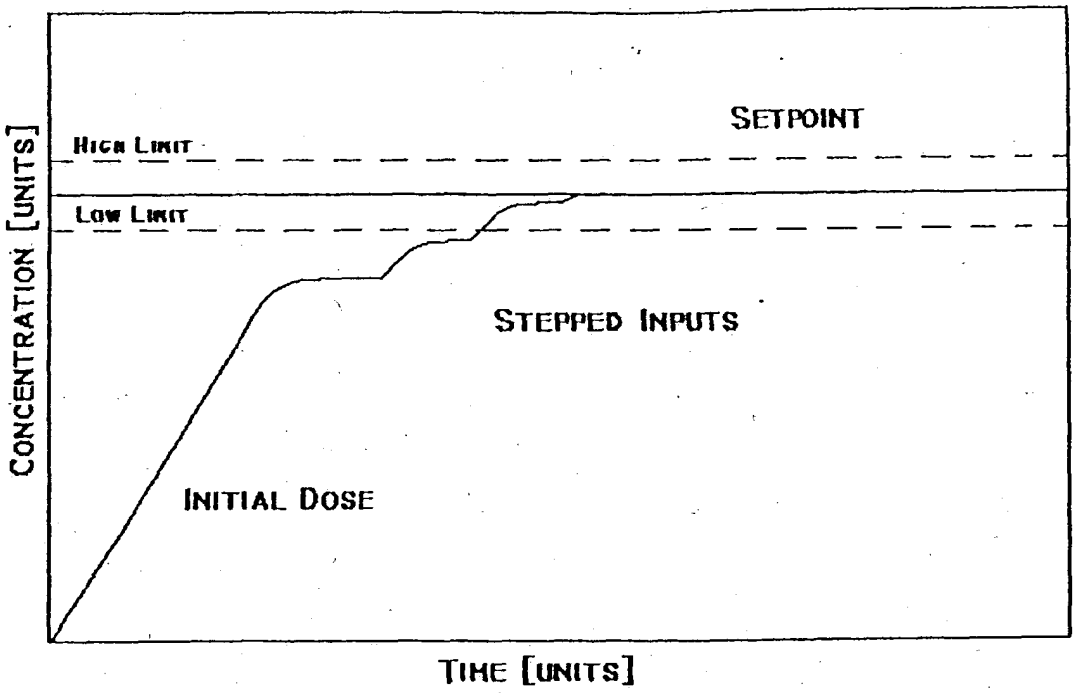


Figure 15

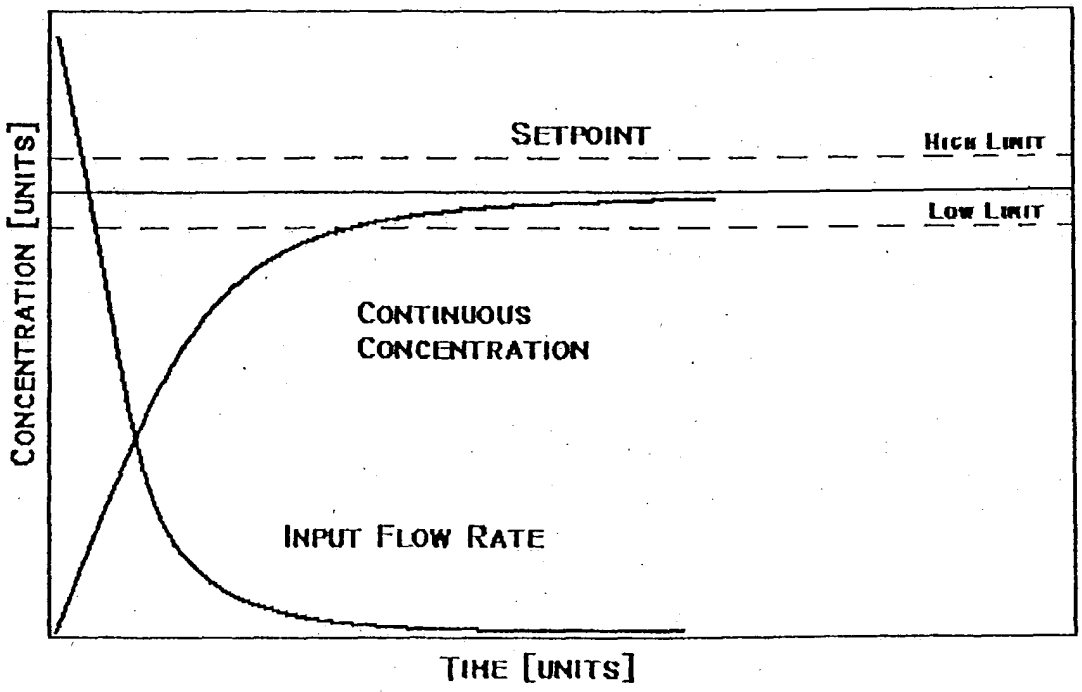


Figure 16

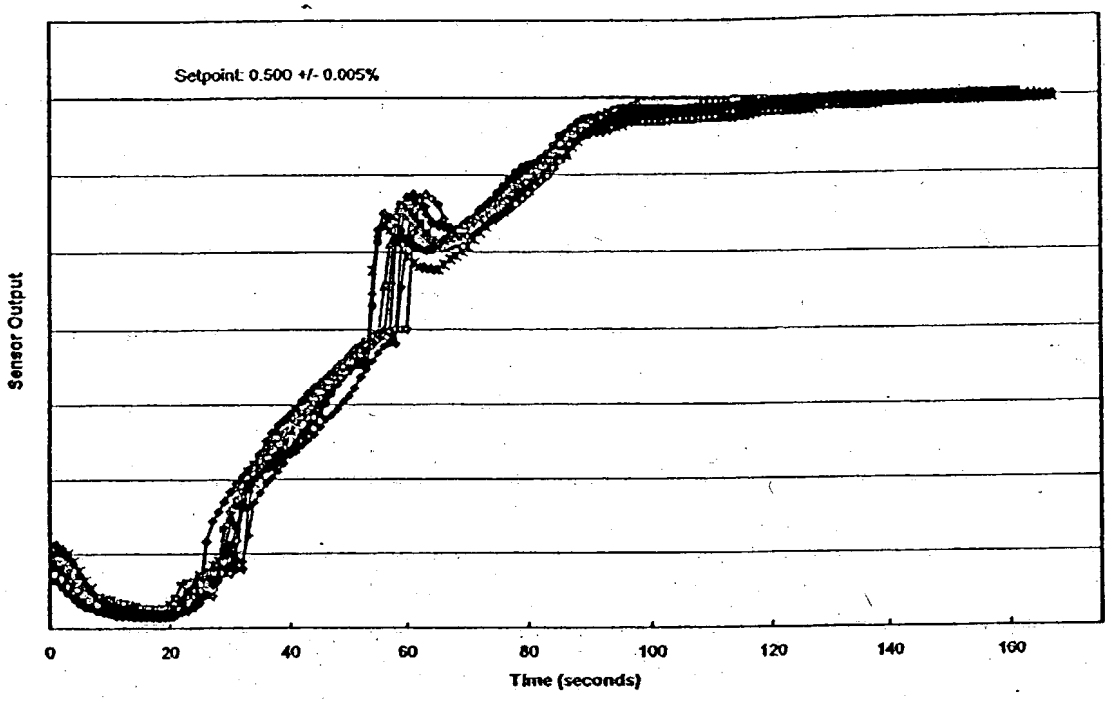


Figure 17

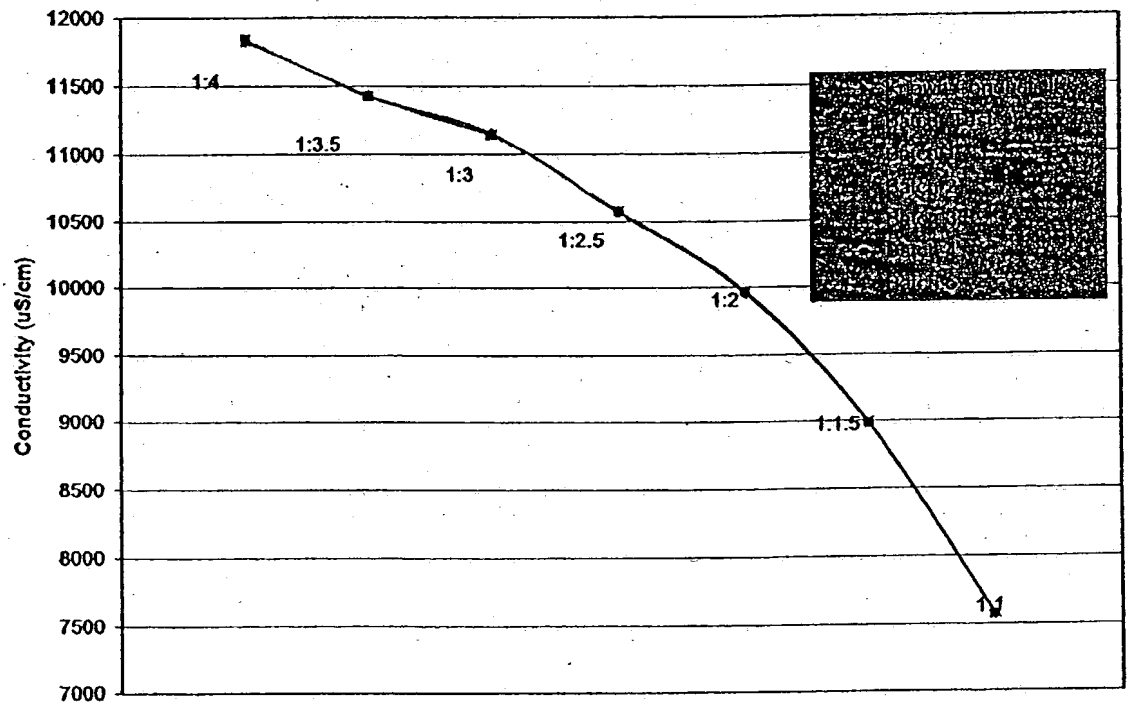


Figure 18

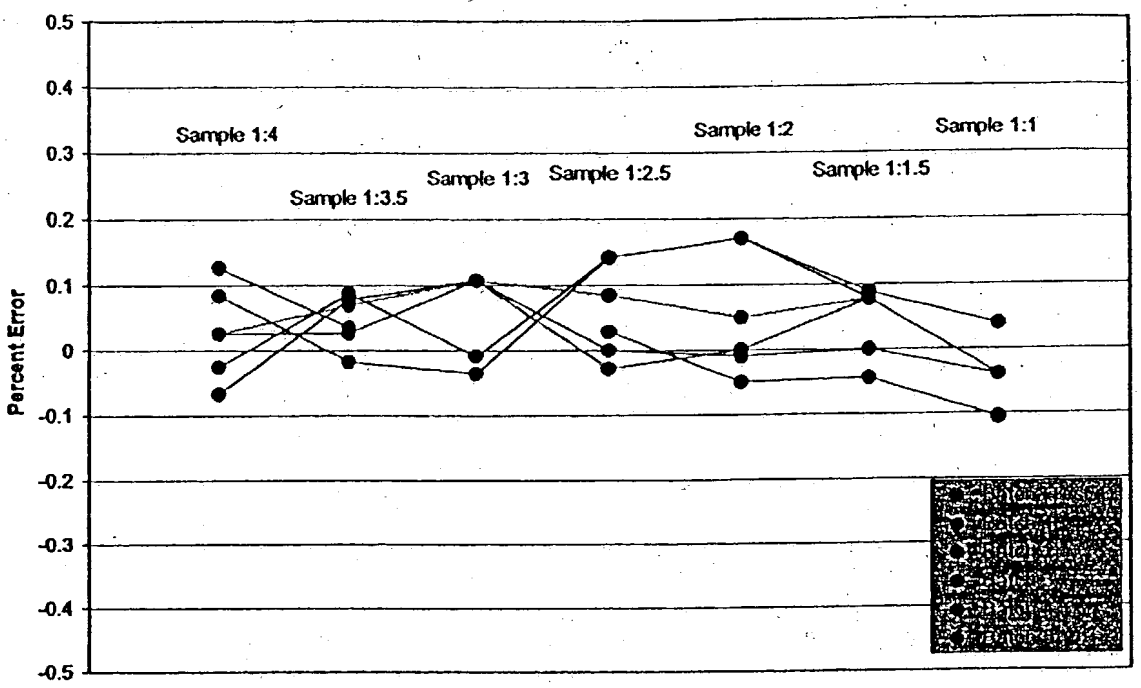

0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
Percent Error
Sample 1:4
Sample 1:3.5
Sample 1:3
Sample 1:2.5
Sample 1:2
Sample 1:1.5
Sample 1:1

Figure 19